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WASHINGTON STATE VENTILATION AND INDOOR AIR QUALITY CODE

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For alternate formats, call 206-296-6600.

VIAQ - USING HEAT RECOVERY VENTILATION SYSTEM (# VIAQ 5)

Prescriptive design requirements for intermittent whole house ventilation using a heat recovery ventilation system for residences four stories or less may comply with V.I.A.Q.C. section 303 as indicated below. Residences designed to comply with section 302 shall submit calculations for review and be flow tested per section 302.1.1. System characteristics not identified below and continuously operated systems shall comply with section 302. Residences more than four stories in height shall comply with section 304.

A. SOURCE SPECIFIC VENTILATION REQUIREMENTS:

1. **EXHAUST FAN REQUIREMENTS (Reference Table 3-1):**
 - a) Bathrooms, laundries, and powder rooms: 50 CFM @ 0.25" W.G.
 - b) Kitchens: 100 CFM @ 0.25" W.G. Range hoods and down draft ranges shall be rated not less than 100 CFM @ 0.10" W.G.
2. **EXHAUST DUCT REQUIREMENTS:**
 - a) Be insulated to a minimum R-4 in unconditioned spaces.
 - b) Be equipped with a backdraft damper.
 - c) Terminate outside the building.
 - d) Comply with Table 3-3 and section 303.3.4..

***NOTE:** All manufacturer's fan flow ratings shall be determined as per HVI 916 (April 1995) or AMCA 210.*

B. WHOLE HOUSE VENTILATION REQUIREMENTS:

Outdoor air shall be supplied to all habitable rooms (at flow rates specified in Table 3.2) using the following methods:

1. **HEAT RECOVERY VENTILATION SYSTEMS SHALL COMPLY WITH THE FOLLOWING:**
 - a) All ducts in heat recovery system shall not be less than 6 inches.
 - b) Install balancing dampers on the inlet and exhaust side.
 - c) Install flow measurement grids on the supply and return.
 - d) Minimum flow rating shall be not less than what is specified in Table 3-2.
 - e) Maximum flow rate in Table 3-2 does not apply.
 - f) Supply ducts (in conditioned space) installed upstream of the heat exchanger shall be insulated to a minimum of R-4.
 - g) Inlets shall be screened from entry by leaves and other materials.
 - h) Not to receive fresh air from the following areas:
 1. Within ten feet of an appliance vent outlet, unless the vent outlet is three feet above the fresh air inlet.
 2. Where it will pick up objectionable odors, fumes, or flammable vapors.
 3. A hazardous or unsanitary location.
 4. A room or space having any fuel burning appliances therein.
 5. Closer than 10' from a vent opening of a plumbing drainage system unless the vent opening is at least three feet above the fresh air inlet.
 6. Attics, crawl spaces, or garages.

***NOTE:** Outdoor air inlets are not required, if the home has a ducted forced air heating system that communicates with all habitable rooms and has interior doors undercut a minimum of ½ - inch above the finish floor covering.*

2. VENTILATION CONTROLS:

- a) Be controlled by a 24-hour clock timer.
- b) Provide capability of continuous operation, manual and automatic control.
- c) The 24-hour clock timer shall be readily accessible.
- d) At the time of final inspection, the automatic control timer shall be set to operate the whole house fan for at least 8 hours a day.

***NOTE:** A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)". Installers shall provide the manufacturer's installation, operation instructions, and a whole house ventilation system operation description.*

C. FRESH AIR DISTRIBUTION:

Outdoor air shall be distributed to each habitable room by individual fresh air inlets. Provisions shall be made to ensure airflow by the installation of distribution ducts, transoms, or undercutting doors a minimum of 1/2 inch above the finished floor coverings.

***NOTE:** Outdoor air inlets are not required, if the home has a ducted forced air heating system that communicates with all habitable rooms and has interior doors undercut a minimum of ½ - inch above the finish floor covering.*

D. VENTILATION SYSTEM TESTING:

At the discretion of the building official, flow testing may be required to verify that the mechanical system(s) satisfies the requirements of section 303.

TABLE 3-1
Minimum Source Specific Ventilation Capacity Requirements

| | Bathrooms | Kitchens |
|----------------------|------------------------------------|----------|
| | Intermittently operating 50 cfm | 100 cfm |
| Continuous operation | 20 cfm | 25 cfm |

TABLE 3-2
Ventilation Rates For All Group R occupancies four (4) stories and less*
Minimum and Maximum Ventilation Rates: Cubic Feet Per Minute (CFM)

| Floor Area, ft ² | Bedrooms | | | | | | | | | | | | | |
|-----------------------------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 2 or less | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| <500 | 50 | 75 | 65 | 98 | 80 | 120 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 |
| 501-1000 | 55 | 83 | 70 | 105 | 85 | 128 | 100 | 150 | 115 | 173 | 130 | 195 | 145 | 218 |
| 1001-1500 | 60 | 90 | 75 | 113 | 90 | 135 | 105 | 158 | 120 | 180 | 135 | 203 | 150 | 225 |
| 1501-2000 | 65 | 98 | 80 | 120 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 | 155 | 233 |
| 2001-2500 | 70 | 105 | 85 | 128 | 100 | 150 | 115 | 173 | 130 | 195 | 145 | 218 | 160 | 240 |
| 2501-3000 | 75 | 113 | 90 | 135 | 105 | 158 | 120 | 180 | 135 | 203 | 150 | 225 | 165 | 248 |
| 3001-3500 | 80 | 120 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 | 155 | 233 | 170 | 255 |
| 3501-4000 | 85 | 128 | 100 | 150 | 115 | 173 | 130 | 195 | 145 | 218 | 160 | 240 | 175 | 263 |
| 4001-5000 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 | 155 | 233 | 170 | 255 | 185 | 278 |
| 5001-6000 | 105 | 158 | 120 | 180 | 135 | 203 | 150 | 225 | 165 | 248 | 180 | 270 | 195 | 293 |
| 6001-7000 | 115 | 173 | 130 | 195 | 145 | 218 | 160 | 240 | 175 | 263 | 190 | 285 | 205 | 308 |
| 7001-8000 | 125 | 188 | 140 | 210 | 155 | 233 | 170 | 255 | 185 | 278 | 200 | 300 | 215 | 323 |
| 8001-9000 | 135 | 203 | 150 | 225 | 165 | 248 | 180 | 270 | 195 | 293 | 210 | 315 | 225 | 338 |
| >9000 | 145 | 218 | 160 | 240 | 175 | 263 | 190 | 285 | 205 | 308 | 220 | 330 | 235 | 353 |

*For residences that exceed 8 bedrooms, increase the minimum requirement listed for 8 bedrooms by an additional 15 CFM per bedroom. The maximum CFM is equal to 1.5 times the minimum.

TABLE 3-3
Prescriptive Exhaust Duct Sizing

| Fan Tested CFM @ 0.25 W.G. | Minimum Flex Diameter | Maximum Length Feet | Minimum Smooth Diameter | Maximum Length Feet | Maximum Elbows ¹ |
|----------------------------|-----------------------|---------------------|-------------------------|---------------------|-----------------------------|
| 50 | 4 inch | 25 | 4 inch | 70 | 3 |
| 50 | 5 inch | 90 | 5 inch | 100 | 3 |
| 50 | 6 inch | No Limit | 6 inch | No Limit | 3 |
| 80 | 4 inch ² | NA | 4 inch | 20 | 3 |
| 80 | 5 inch | 15 | 5 inch | 100 | 3 |
| 80 | 6 inch | 90 | 6 inch | No Limit | 3 |
| 100 | 5 inch ² | NA | 5 inch | 50 | 3 |
| 100 | 6 inch | 45 | 6 inch | No Limit | 3 |
| 125 | 6 inch | 15 | 6 inch | No Limit | 3 |
| 125 | 7 inch | 70 | 7 inch | No Limit | 3 |

1. For each additional elbow subtract 10 feet from length.
2. Flex ducts of this diameter are not permitted with fans of this size.

Check out the DDES Web site at www.metrokc.gov/ddes